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STATE OF ALASKA

William A. Egan, Governor

ANNUAL REPORT OF PROGRESS, 1962 - 1963

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-4

SPORT FISH INVESTIGATIONS OF ALASKA

Alaska Department of Fish and Game

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INTRODUCTION

This report of progress consists of Job Segment Reports from the State of Alaska Federal Aid in Fish Restoration Project F-5-R-4, "Sport Fish Investigations of Alaska".

The project is composed of 25 separate studies designed to evaluate the various aspects of the State's recreational fishery resources. While some studies are of a more general nature and deal with gross investigational projects, others have been developed to evaluate specific problem areas. These include studies of king salmon, silver salmon, grayling and State Access requirements. The information gathered will provide the necessary background data for a better understanding of local management problems and development of future investigational studies.

The assembled progress reports may be considered fragmentary in many respects due to the continuing nature of the respective studies. The interpretations contained therein, therefore, are subject to re-evaluation as work progresses and additional information is acquired.

Volume 4 Report No. 6-F

JOB COMPLETION REPORT

RESEARCH PROJECT SEGMENT

State: Alaska Name: Sport Fish Investigations of Alaska.

Project No: F-5-R-4 Title: Silver Salmon Egg Taking Investigations in Cook Inlet Drainage.

Job No: 6-F

Period Covered: July 1, 1962 to June 30, 1963.

Abstract:

Swanson River, Bear Creek and Dairy Creek were selected as sources for the procurement of silver salmon eggs on the Kenai Peninsula. Eggs taken from these three locations were transported to the Fire Lake Hatchery where they were hatched and reared to plantable size.

Swanson River was selected as a source of eggs because it was easily accessible by road and the egg-taking operation would not conflict with other interests. Bear Creek was selected as an egg-taking source because of the existing weir on this creek and it was anticipated that Bear Lake would receive an overescapement of silvers as a result of the large run in Resurrection Bay in 1962. Dairy Creek was selected as an egg-taking source because of the large overescapement in this small creek.

The Swanson River weir was set in place on September 17 and the first silver salmon was trapped on September 22. The first eggs were taken on October 5th with a total of 305,924 eggs taken and averaging 3,154 eggs per female spawned.

At Bear Creek the first eggs, 731,283, were taken on October 19th and averaged 4,203 per female spawned.

The first eggs were taken at Dairy Creek on October 12th. A total of 426,841 eggs were taken averaging 4,183 per female spawned.

Recommendations are presented for future egg-taking operations on the Kenai Peninsula and to increase the effectiveness of the Swanson River weir.

Recommendations:

The three sources of silver salmon eggs utilized in 1962 should be used in 1963 providing sufficient escapement occurs in these waters and there is no conflict of interests involved.

The Swanson River weir should be set in place no later than August 25.

It is recommended that this investigation for sources of silver salmon eggs be continued. It is possible that we can locate better sources of eggs than we have at present.

The design of the Swanson River weir should be modified slightly so that it will operate more efficiently. The depth of the upstream "V" should be increased and deflectors placed upstream from the trap to divert additional flows into the trap thereby creating a greater attraction to migrating salmon.

This project should be amended to include investigating possible sources for cutthroat, steelhead and resident rainbow eggs.

Objectives:

To establish sources for procuring silver salmon eggs from the Kenai Peninsula. A source of eggs should

be sought which does not conflict with existing use, either recreational or commercial. The location or locations selected should be readily and economically accessible by existing means of transportation.

A race of silver salmon with a lake rearing background in its life cycle will be sought in anticipation of landlocking the fry obtained from this egg take.

Techniques Used:

On September 17, a slat type "V" weir was set in place in the Swanson River 100 feet downstream from the northern most bridge across the Swanson River (Figure 1). Stream flow at the weir site was very moderate, less than 1 foot per second, and the stream bottom consisted of medium size gravel.

The weir was prefabricated in Seward and then transported to the weir site. Panels were framed out of 1" by 4" native spruce lumber. The slats, also made of 1" by 2" spruce, were spaced 1½ inches apart and nailed edgewise in the panel frames. Each panel was made 2½ feet wide by 6 feet in length for ease in handling. Steel fence posts, spaced 3 feet apart, were driven into the riverbed in the form of a large "V" with the apex of the "V" pointing upstream (Figure 1). The panels were bolted to the steel fence posts, forming the body of the weir. Then a 3 foot by 6 foot trap was placed at the apex of the weir "V"; however, it was later found that the size of the trap was too small. The trap was enlarged to 3 feet by 10 feet which proved to be satisfactory.

Two 4 foot by 8 foot holding pens were prefabricated and transported to the weir site. These pens were placed in the river alongside the trap but directly below the deflector which was set in place to divert additional flows into the trap to create a greater velocity attraction at the mouth of the trap (Figure 2).

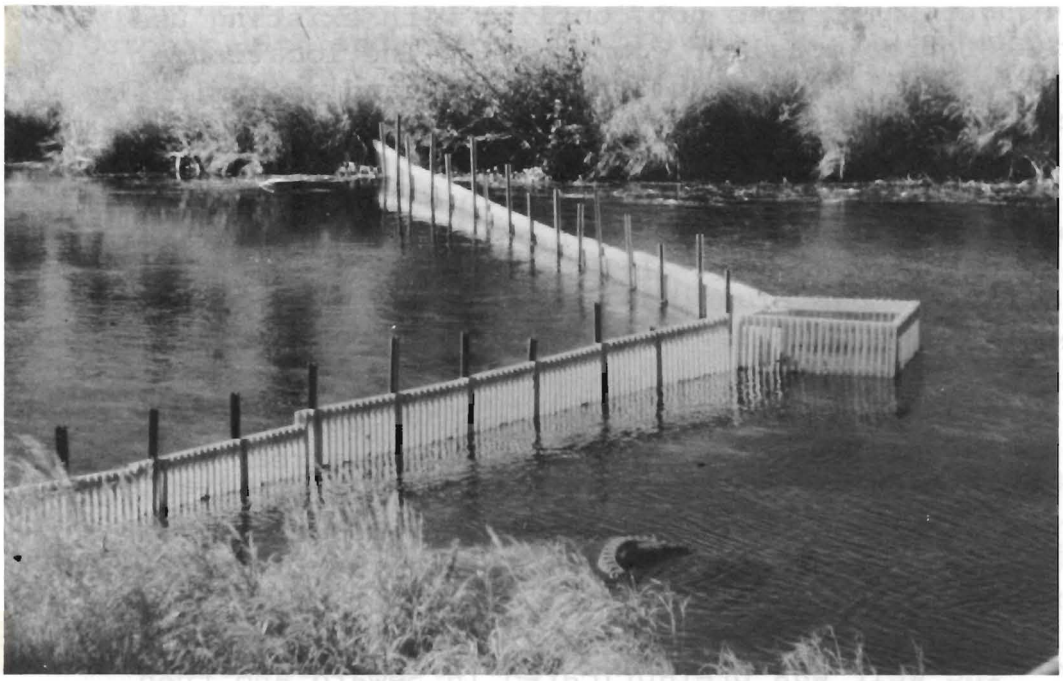

Figure 1. Over-all view of the Swanson River weir before enlarged trap and deflector wing were installed.

Figure 2. Upstream view of the Swanson River weir with deflector wing in place.

During the spawn-taking operations the female silver salmon were killed by means of a sharp blow on the top of the head. Then dorsal artery, in the caudal peduncle, was severed and the dead fish were placed in the bleeding rack (Figure 3). The dead females were allowed to bleed for 10 to 20 minutes before the spawning operations were started. In spawning the dead females, an incision was made along the side starting just posterior to the gill opening and continuing downward to the anus (Figure 4). After this incision was made the eggs were allowed to fall freely out of the body cavity and into a plastic basin where they were fertilized. The fertilized eggs were transported to the Fire Lake Hatchery in 5 gallon milk cans which were completely filled with water to reduce the possibility of damaging the eggs as a result of sloshing enroute to the hatchery.

Findings:

Swanson River. The Swanson River weir was put in place on September 17th and was in operation until October 31st at which time the egg-taking operations were terminated. A total of 239 adult silver salmon were successfully trapped at Swanson River weir. The first silver salmon was taken in the trap on September 22nd (Table 1) and spawn taken on October 5th.

Statistics for the silver salmon egg-taking operation on the Swanson River are as follows:

Total number in trap	239
Total holding mortality	1
Total number of females spawned	97
Estimated number of males spawned	48
Total number of eggs taken	305,924
Average number of eggs per female spawned	3,154
Total number of fish escaped from live boxes	37

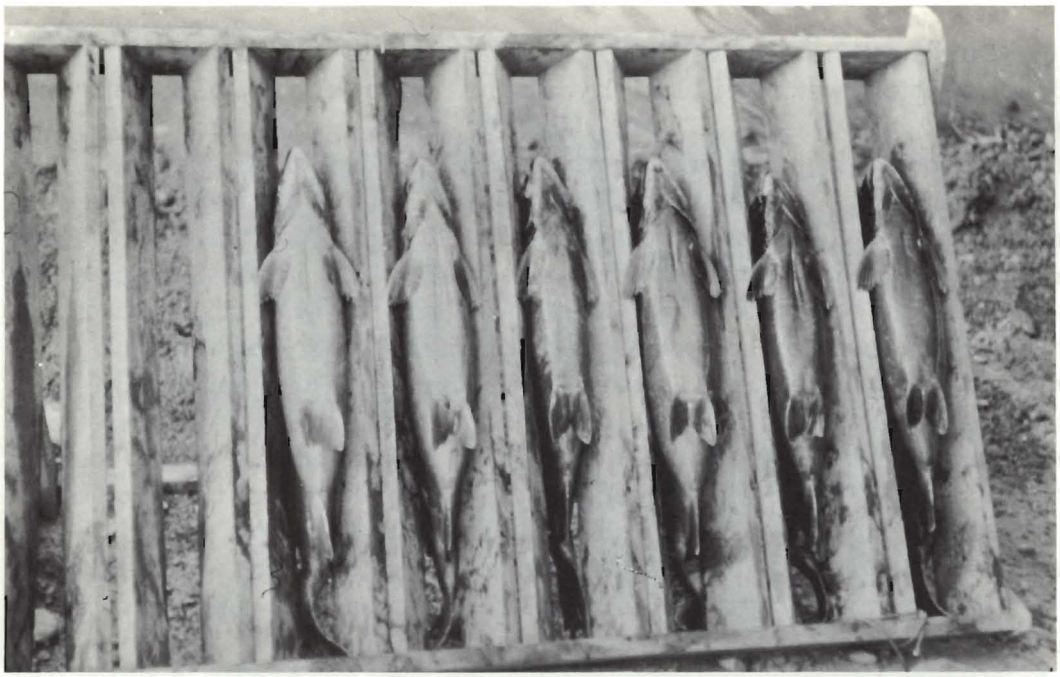

Figure 3. Silver salmon bleeding rack, Swanson River weir.

Figure 4. Silver salmon egg take, Swanson River weir.

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Figure 3. Silver salmon bleeding rack, Swanson River weir.

Figure 4. Silver salmon egg take, Swanson River weir.

It was discovered after the weir was in place that the depth of the "V" leading to the trap was too shallow. It also became apparent that there were insufficient flows passing through the trap to attract the adult silver salmon into entering the orfice. A deflector was then installed upstream from the trap to divert additional flows through the trap (Figure 2). After installing this deflector and enlarging the trap, adult silver salmon entered the trap in satisfactory numbers. Foot surveys below the trap revealed that approximately two hundred adult silver salmon spawned below the weir rather than entering the trap. Surveys of the river and its tributaries above the weir indicated that numerous adult silver salmon had passed the weir site before the weir was set in place. One tributary stream located two miles above the weir was surveyed and approximately 100 spawned out silvers were counted in this stream.

From the number of silver salmon counted above the weir site, it is apparent that the weir was installed after at least half the migration in the river had already passed the weir site. It is evident from the data collected that this weir in the future should be set in place two to three weeks earlier than it originally was.

One of the major advantages of this weir was the condition of the adult salmon when they reached the weir. It was necessary to hold the females from ten to fifteen days before stripping them. If greater numbers of salmon had been taken at the trap the holding time would have been reduced. We were forced to hold fish until sufficient numbers had been trapped to warrant initiating the spawning operations.

The site selected on the Swanson River was ideally located in relation to existing roadways and housing facilities for the spawn-taking crew. The weir was located within 100 feet of an access road on the National Moose Range.

TABLE 1. Daily weir counts of silver salmon at the Swanson River weir, 1962.

Date	Sex	
	Males	Females
September 22	2	15
23	5	12
24	1	12
25	15	21
26	12	22
27	1	1
28	1	8
29		
30	1	8
October 1	2	
2		
3	3	6
4		
5	1	-
6		
7		
8	2	-
9		
10		
11		
12	2	1
13		
14		
15		
16		
17	6	6
18	2	2
19	10	32
20	8	17
21		1
22		
23		
24		
25		1
Totals	74	165
	239	

Between September 22 and 24, 14 males and 23 females escaped from the live boxes at the weir.

TABLE 2. Daily weir counts of silver salmon at the Bear Creek weir, 1962.

Date	Number	Date	Number
September 16	1	October 16	11
17	6	17	1
18	0	18	7
19	0	19	33
20	3	20	14
21	21	21	3
22	22	22	15
23	25	23	37
24	519	24	41
25	81	25	90
26	68	26	12
27	38	27	12
28	43	28	139
29	1	29	7
30	34	30	20
		31	17
October 1	22		
2	45	November 1	5
3	3	2	7
4	1	3	20
5	1	4	13
6	1	5	18
7	0	6	2
8	0	7	2
9	4	8	0
10	0	9	2
11	0	10	3
12	0	11	1
13	0		
14	0		
15	12		
		Total	1483

Bear Creek. Bear Creek was selected as a source of eggs in anticipation of a large escapement occurring here as a result of the extremely large run in Resurrection Bay. The existing weir facilities on Bear Creek were utilized to obtain adult silver salmon for spawning purposes. The first adult silver salmon reached the Bear Creek weir on September 16th (Table 2) and the last adult silver salmon was taken on November 11th. A total of 1,483 silver salmon were successfully trapped and the first spawn taken on October 19th.

Statistics for the Bear Creek silver salmon egg-take are as follows:

Total number of adult silver salmon counted at the weir	1,483
Total holding mortality	11
Total number of females spawned	174
Estimated number of males spawned	87
Total number of eggs taken	731,283
Average number of eggs per female spawned	4,203

Dairy Creek. This creek is a small tributary to Resurrection Bay. The creek is not over 300 yards long and had a total escapement in 1962 of 603 adult silver salmon plus additional red and pink salmon. In view of the obvious overescapement it was deemed advisable to initiate an egg taking program to better utilize the spawn available at Dairy Creek. The creek is so small that a weir was not necessary. The adult silver salmon were dip-netted from the stream and spawned on October 12th.

Statistics for the silver salmon egg take on Dairy Creek are as follows:

Total number of silver salmon counted	603
Total number of females spawned	103
Estimated number of males spawned	51

TABLE 3. Silver salmon escapement counts on Dairy Creek, 1962.

Date	Dead salmon	Live salmon
September 28	18	130
October 20	130	50
November 3	192	75
November 15	253	10
Total	593	
Total escapement as of November 15		603

1 ounce to 1 pound 9 ounces, with a mean of 7.1 ounces. The sex ratio was 26 females to 5 males. Investigation of the stomach contents showed Diptera larva to be the favored item followed by Tricoptera larva, Gastrapods and Molluscs.

A temperature series was taken and is illustrated in the following table.

Table 3. Temperature Series, Green Lake

August 1, 1962

Depth	Temperature	Depth	Temperature
Air	69° F	35 feet	43.5° F
Surface	48° F	40 feet	43.5° F
5 feet	47° F	45 feet	42.5° F
10 feet	45° F	50 feet	42.2° F
15 feet	44° F	55 feet	41.5° F
20 feet	44° F	60 feet	41° F
25 feet	44° F	65 feet	40.5° F
30 feet	43.7° F	70 feet	40.5° F

The pH was recorded at 6.5 and the dissolved oxygen, from the 70 foot contour, was 7.7 parts per million.

Swan Lake

Swan Lake is a 27 acre lake that lies within the city limits of Sitka. Public access is readily available from city and state owned land. It's shoal area is extensive and heavily weeded. There are no permanent inlets or observable spawning areas. The outlet stream is open to fish migrations though difficult because of semi-blocks.

Two gill nets were set for 16 hours on August 6-7, 1962. The resultant catch was 33 cutthroat, 2 Dolly Varden and 1 eastern brook trout. The cutthroat ranged in fork length from 6½ inches to 16 5/16 inches, and in

Total number of eggs taken	426,841
Average number of eggs per female spawned	4,183

Future egg takes from Dairy Creek should be assessed annually and conducted only if excessive escapement exists.

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Date: March 15, 1963

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